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Travel Safety Fear Factor among Vulnerable Group of Travelers: The Urban Scenario

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Abstract

Having known the fact that crime against women is at an alarming rate, poor public transport supply had further worsened the problem. This is especially true for many working women who have no choice but to travel using public transport to their work place in an urban area. The design of the public transport as to meet their travelling needs is still lacking in Malaysian urban scenarios. This has resulted in a higher rate of feeling unsafe while travelling to work which is a concern among these vulnerable travellers. Tapping on age and time of travelling, women travelling safety is further analyze.

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1. Introduction

It has long been recognized that women and men possess different travelling needs. Even though the needs of transport for both genders might be on the same purpose that is working, women unique travelling characteristics in a society have given them different transportation needs as compared to men. Progress has been made to identify the factors affecting women travelling safety because women are

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considered as a group of people who will face the highest risk of victimization. Therefore they are known as the vulnerable group of people just like the disabled ones who fall under same category. As a result, Hanlon (1995) contended that their access to a safe and good public transport resources is critical especially to those living in an urban area. This is due to the fact that women who live in urban area and depend on public bus to commute to work into city centre were believed to have a routine journey on every weekday. Thus they are potentially exposed for being the victim of crime. Moreover a recent study by Seiji, Kazunori, Tatsuto, Takahito And Kenji (2011) had revealed that the fear of crime has been growing currently. They concluded that one of the reasons for this is the changes in social structure that could attribute to the population inflow into cities as well as families are becoming more nuclear.

2. Literature review

A study by Taylor (1995) indicated that the urban environment is like a magnet pulling all types of human activities including the negative and illegal activities. This has put a lot of stress on the urban community which developed into a type of fear known as fear of crime.

Case by case from previous studies done in developed countries (Davidson, 1981; Focas, 1989; Grieco, Pickup, & Whipp, 1989; Hanson & Hanson, 1981) have further indicated that poor planning decision making have significantly contributed to the safety problem. This includes failure of those involved in planning and transport provision to considered women travel needs especially women in an employment sector (Grieco, Pickup, & Whipp, 1989). Hanson and Hanson (1981) further pointed out that the traditional factors thought to influence women's travel pattern are matters such as perceived travel time and cost, the physical effort involved, journey convenience, including service frequencies, transfers and waiting, comfort, knowledge or information of service provision and perhaps even the mode.

The relationship between perceived risk and women's travel pattern has not been extensively researched because safety has not generally been thought to be a strong influence on travel pattern (Anderson & Panzio, 1986). However, Lynch and Atkins (1988) further argued that there is one aspect of travel safety that does have considerable influence on travel patterns and that is personal security. The risk and fears of physical attack, harassment and other anti social behaviour have become a significant influence on the habits of many urban dwellers (Lynch & Atkins, 1988). They also agreed that although apprehension about personal security affects many people, certain groups are particularly vulnerable and the obvious example is women.

Table .1. Projected index crime. Sources: Amar, (2006)

Year	Projected Index Crime
2005	160,972
2010	183,015
2015	208,076

One of the most significant discussions by Focas (1989) in transportation and safety is that if a woman is to travel safely, then the public transport system must be first geared towards their travel needs. Although much work has been done previously to look at the overall issues, more studies need to be conducted to examine critically the real factors that contribute towards the women travel safety issues in an urban area. Astrop (1996) further added that, it is important to satisfy women's travelling needs because he concluded that while men favour speed, women clearly put personal security on top of their list. Among other factor being discussed in the past literature about the issues of women and travelling

safety is time and age of women had been identified as two major factors that influence the feeling of safe while travelling among women. Many findings from the past studies have also shown that these two factors create a significant value to the feeling of safe among women traveller in urban areas. Among the study conducted in Malaysia by Amar (2006) had projected that the total crime index in the year 2015 would have reached the 200,000 mark. Following is the projection of year 2015 crime index base on year 2004 crime occurrence.

In this study, Amar (2006) also reported that 89% of the respondents were “worried to extremely worried” about the occurrence of crime. One of the possible reasons being discussed by him was the macro economics factors which included unemployment rate. He then further examined the demographic variables and urbanization pattern that affected the crime occurrence and reported that population age 15-25 appeared to be most influence in crime. Further exploration on the same issue in this study however focuses on the issues of time of travelling and age of women to look at the empirical evidence in the top urban centre in Malaysia and fear of crime among these travellers characteristics.

2.1. Time

Time in this study refers to the time of travelling either day or night. A study on bus passengers survey conducted by Lynch and Atkins (1988) in Southampton stated that the apprehension or fear affected the travelling behaviour of women. In their study of safety at bus stop, 16% of those surveyed felt unsafe by day and 35 % at night. The authors concluded that women would avoid putting themselves into what they considered to be vulnerable situations, sometimes forgoing travel all together.

In the late 1980s, much research on women’s travelling safety issues found that between 50% to 70% of women were frightened of going out after dark in cities (Atkins, 1989). Focas (1989) on the other hand tried to find an answer towards the fear of travelling after dark in major city centre in London. He found that more than half of the attacks on the bus passengers occurred on street (while walking) during the night time, 8% at the bus stop and another 8% in the parks and open space. Focas also carried out a number of investigations into the real time of crime occurrence. The study revealed that one third of the crime in London actually happened between 12.00 noon to 4.00pm, one third between 4.00pm to 7.00pm and one third 7.00pm to 1.00am. In the mid 1990s, the same consistent findings were found to be on the level of safety if women were to travel after dark where higher feeling of unsafe was reported during that travelling period (British Crime Survey, 1994). The survey also pointed out that one of eight women surveyed said that she felt so unsafe taking a public transport after dark that they avoided using it. To support the findings, a study by Sinha et al (1990) pointed out that women who felt more insecure about the transit system exhibited obvious reduction in night time activity. This avoidance behavior is further confirmed by a finding showing that 63% of women who felt unsafe using the bus alone at night tried to avoid the trip. In year 2005, a study on time of crime occurrence in Malaysia conducted by Criminal Department Unit recorded the same conclusion. The study revealed that time of travelling had recorded different number of crime occurrence.

Based on Table 2, most crime happened from 7.00pm-11.00pm. This was a common time for returning from work journey. The second highest time where crime occurred was at around 11 am –3.00pm where most of them went out for lunch. Another critical time where crime occurred on the streets was also during trips of going to work, which took place at 7.01am-11am. However, the statistics provided by the CDU might have been more interesting if it considered the feeling of safety by woman commuters especially when travelling at different times of the day. Due to the lack of recent statistic of crime in Malaysia, this study attempts to fill up the gap of finding the real occurrence time for most travellers especially women in urban area who have no other choice but to travel using public transport from their residential areas to the city centre for working purposes.

Table 2. Time of crime occurrence in Malaysia for the year 2005. Sources: Royal Malaysia Police Criminal Department, (2005)

Year	0301-0700	0701-1100	1101-1500	1501-1900	1901-2300	2301-0300
2005	15	113	117	77	166	34
%	2.87	21.65	22.41	14.75	31.8	6.51

2.2. Age

Apart from travelling time, another major factor identified to affect women's level of safety is age. Numerous studies have attempted to explain the attributes of age as a powerful predictor of fear (British Crime Survey, 1994; Evans, 1995; Focas, 1989; Gordon, Kumar, & Richardson, 1989; Hough & Mayhew, 1985; Joanne, 2001).

Previous research examining age and level of fear by Ferraro and LaGrange (1987), articulated that no relationship has been found between age and fear of crime. They argue that 'fear of crime' is not as serious as in the lives of the elderly as portrayed in the literature and media. Their overview of research findings concluded that elderly people as a group are not 'fearful' of crime than those of other ages. They also contended that the 'fear' of older people might not be associated with criminal acts as such but more due to sign of disorder and lack of community control. It is said that being bothered or intimidated by unruly behaviour from young or disorderly people may be contributing more to an older person's expression of a lack of safety than the crime itself and should not be described as 'fear of crime'.

Table 3. Proportion of women feeling safe travelling by bus during the day and night by age group. Sources: women on the move survey, (1982)

Age group	During the day	At night
16-19	83%	48%
20-54	91%	41%
55-60	86%	36%
Over 60 years	83%	21%
All women	88%	37%

Table 4. Crime victimization for women by age groups in Malaysia. Sources: Royal Malaysian Police Department Report, (2004)

Age Group	2001	2002	2003	2004	Total
Below 25	674	603	507	250	2,034
26-35	1,117	964	961	441	3,463
36-45	897	801	716	359	2,773
46 and Above	419	397	371	157	1,344
Total	3,107	2,755	2,555	1,207	

To challenge the view, Evan (1995) had attempted to explain that when it comes to age, it is customary to report that the elderly are the most afraid, and for many crimes, this situation is true. However, he then mentioned that when it comes to crimes like rape, sexual assault and stranger attacks, the younger women tend to be more fearful. The finding from British Crime Survey in 1994 concluded that older women are likely than other respondents to consider that they would be the victims of such crime. Both of the studies

are supported by Joanne (2001) who claimed that the risk of being crime victims differs by age. In her major study of women and crime experience, she concluded that although all women are potential victims of rape, sexual assault, groupers, nudging and obscene language, it appears that some women are more at risk than others. The study also revealed that traditionally, young women aged 16 to 24 are most likely to experience rape. Therefore, if no proper security measure is installed to monitor their movement while travelling by public transport especially buses, it is believed that the risk of being the victims is much higher.

In contrast with Evan's view, Gordon et al (1989) identified that higher level of fear was reported by younger bus passengers instead of the elderly. Their study provided an in-depth analysis on the violent crime occurrence and the setting of crime occurrence among the younger woman travellers. One of the key findings being reported was that 91% of the violent crimes such as snatch, murder, firearm robbery and rape occurred outside the home.

The study also revealed that younger women are most likely to be implicated in criminal acts that occur in public places such as while walking to and from the stops, waiting at the bus stop and in the bus. Another major finding from the study is that the crime is more likely to occur at night. Since younger people make up the largest portion of people spending more time outside the home, they were exposed to higher risk of becoming the victims as compared to elderly who always take precautions. In addition, the study also reported that each year in United States, approximately 5 million women over the age of twelve experience some form of violent victimisation while they are travelling.

Within the same year, Focas (1989) further looked into the matter critically and found evidence of Gordon et al's claim. The study draws our attention to look at the various ages and women's perceptions of safety especially when they travel by bus. The study traced the types of crimes that normally happen to younger women and found that the highest proportion of women claimed to experience harassment, verbal abuse, threat, being followed, groupers, nudging and obscene language are those of the younger age group (16-20 years). Focas also highlighted that the proportion of crime occurrence fell steadily with the age group with women age 50 and over experienced less crime.

A recent finding from Seiji, Kazunori, Tatsuto, Takahito and Kenji (2011) who had conducted their study in Japan found that elderly people have more positive attitude towards local crime prevention activities compared to younger people. They also further indicated that people who reported a less consistent fear of crime tend to have a more aloof attitude toward community crime prevention activities. Being the least group to be exposed to crime victims, Smith and Torstensson (1997) questioned why "the least victimized by violence was the most fearful of crime (elderly)." They claimed that this is a "central paradox" in fear of crime literature. The following table 3 explains in detail the feeling of safe by women from different age group.

Women aged 20- 54 years were among the group of people who felt safer travelling by bus during the day with 91%. However, when travelling period changed, the total percentage of feeling safe dropped by 50 % which indicated that they felt less safe when travelling by bus at night. Women aged 60 and more felt that travelling at night created less safe period of travelling for them. Only teenagers age 16-19 felt that travelling for them at night was fairly safe with the total of 48 %. Overall, all age of women agreed that they felt much safer travelling by bus during the daytime as compared to night trip. In Malaysian environment, the statistics of crime victimization cases by age group were reported as in Table 4. From the statistics produced by the Royal Malaysian Police Department, the age group of 26 to 35 years old was more exposed to crime victimization rate as compared to other groups.

This was indicated by the highest number of crime occurrence to the group that was 3,463. Then, it is followed by the second age group, 36-45 years old and the first age group, below 25. The least amount of crime victimization rate occurred to the group of 46 years old and above. The figure however does not indicate further under what circumstances crime victimization occurred. Lack of detailed information

such as place of crime victimization and activity of the victims further puts the attention to the researchers to include “age” as one of the variables to be studied under the travel safety issues.

2.3. *Travel safety*

Having agreed that safety is one of the transport quality elements that should be considered, the definition of safety should also be looked into because it varies according to authors, situation and concept. Safety as being defined by Thygeson (1990) is a relative thing and is extremely difficult to define using definite words of phrase because it varies from day to day which implies that a person is at different levels of safety everyday of his or her life. Whereas for Watkins, Sorrenson and Garrick (2002), they have agreed with the need of safety in a way that it is vitally important to the continual success of the bus way operation.

On the other hand, White (1986) defined travel safety as a state of user feeling safe to be on transport and terminal or stop without fear of injury or harassment. As for Atkins (1989) travel safety refers to the women travelling with a defensive space with a minimal volume of crime occurrence or fear. Based on White and Atkins’s statement, travel safety in this study was measured through the state of user feeling safe and women’s fear of crime while being at the terminal or stop. Characteristics of women traveller such as time of travelling and age of travellers are to be considered for further analysis on the issue.

Brighton and Hove (2005) concluded that the quality of life for a community in an urban neighbourhood is very much affected with the absence of crime that largely influences the perception of safety and security and the absence of fear for the residents.

A study in 2010 by Hafazah and Siti Mareenah in Malaysian context summarized that criminals are getting bolder as they commit the crime in broad daylight and do not need any firearms to rob people. According to them, the rapid increase in population also increases the numbers of bad people in the cities which affects the well being of the urban residents. However, their study only looked at the physical environment of the neighbourhood and ignored the travelling aspect of the people who live in the neighbourhood which creates a gap for this study to fill.

3. **Data analysis**

In this study, travel safety was measured by fear of crime. Using likert scale from 0 (not fear) to 10 (very fear) woman respondents were asked to rate their fear level while travelling during different time of the day that is during day time and night time. This section reports the results gathered from the questionnaires which were personally administered for the respondents in this study (working women who used bus services to commute to work). Approximately 300 respondents were included in this research with focus on three major urban areas in Penang Island namely Pulau Tikus, Jelutong and Ayer Itam. A Spearman’s ranking order coefficient was used to determine if a significant difference exists between independent and dependent variables. The group of daily bus users has been selected as the main respondent for this study as the answer given by this group would better reflect the current travel safety issues they are facing. Following is the discussion on the data analysis obtained from the study. Table 5 compares the mean score obtained for level of safety indication travelling during the daytime and after dark for different types of bus service.

It is apparent from the table that the mean score for travelling during day and after dark had differences especially in terms of fear level indication among women traveller. It could be clearly pointed out that the fear level for a stage bus services commuter was not so high during the daytime as compared to night time travelling. In general, the result indicates that the overall level of fear among current women bus riders is still high especially when travelling after dark. This finding has important implications for

developing a safer travelling period of time by allocating some of the measures such as allocation of additional staff as far as evening bus service is concerned.

Table 5. Mean score for level of fear indication when travelling at different time of the day

Women travel time Time of traveling :	Level of fear
Day time	3.291
After dark	9.048

The average scores of fear level indication among different age group and travelling time were compared through a cross tabulation analysis in order to look at the variation of the fear level indication among the age group.

The following Table 6 indicates the summary of significant difference between level of fear and time of travelling. The comparison provides some detailed information as to find an answer to the question of whether time of travelling affects level of fear for different location.

With regards to the statistical evidence, there was a significant difference between ‘level of fear’ indication and women travelling time. To assess the level of fear indication travelling at different time of the day, both the ‘daytime’ and ‘after dark’ travelling were considered. A one-way ANOVA was used to compare on the level of safety indication using a scale from 0-10.

To further tap on the issue of level of fear towards crime from different location of the research, the following analysis was carried out. From the result in figure 1 it can be seen that there was no significant difference between the level of fear indication while travelling during the ‘day time’ for women living in area like Jelutong and Ayer Itam. However, there was significant difference from those living in Pulau Tikus who reported a higher level of fear. Interestingly, when the subjects were asked to rate their fear level when travelling after dark (at night), the level of fear for all locations was very high with respondents from Pulau Tikus reported highest feeling of fear. As for level of fear indication while travelling ‘after dark’ women living in Jelutong and Ayer Itam, reported no significant difference. Significant difference only existed on the level of fear indication by women living in Pulau Tikus.

Table 6. Summary of one-way ANOVA result on level of fear indication travelling at different time of the day according to location
*significance at $p < 0.01$

Attributes	F	Sig.
Travel time:		
Day time	28.365	.000*
After dark	17.986	.000*

A comparison of the two results reveals that time of women travelling has an effect on the level of safety that a woman experiences especially when travelling by bus. Out of the three areas of research, women living in Pulau Tikus had always reported the highest feeling of fear be it travelling by ‘day time’ or ‘after dark’.

Feeling of fear	Location		
Day Time	Jelutong ● 2.4	Ayer Itam 2.8 ●	Pulau Tikus 4.3
After Dark	Jelutong ● 8.4	Ayer Itam 8.7 ●	Pulau Tikus 9.6

Fig. 1 Comparing level of fear Indication travelling at different time of the day according to location. Means that are connected by a line (● — ●) shows no differences . 0* -not fearful at all. 10*-most fearful

A comparison of the results also reveals that different age groups indicate different level of fear towards travelling either during the daytime or at night. However, the most feeling of 'fear' was reported by women in the age of 40's and 50's.

Feeling of fear	Age of respondent			
Day Time	In the 20's 2.3	In the 30's ● 3.1	In the 40's 3.3 ●	In the 50's 4.2
After Dark	In the 20's 7.7	In the 30's 8.8	In the 40's ● 9.8	In the 50's 9.9 ●

Fig. 2. Comparing level of fear indication travelling at different time of the day according to age. Means that are connected by a line (● — ●) shows no differences. 0* -not fearful at all. 10*-most fearful

As shown in Table 7, the overall responses to this question varied accordingly to the age group in which the elderly group indicated higher level of fear as compared to young travellers. This study supports the finding from Evan's research in 1995. Women in the 20's rated the least amount of fear level when travelling by daytime. As the age group increased, the fear indication level increased (very fear) as well. However, all age groups reported a higher feeling of fear when they were asked to rate on their level of fear travelling after dark with an average of 7.6 and above for all age. The situation was even worst for women in the 50's (9.9) who indicated the highest amount of fear while travelling after dark took place.

This was followed by women in the 40's (9.80), 30's (8.8), and women in the 20's (7.6). One of the issues that emerged from these findings is that the provision of the transport supply especially the bus service should take into consideration on the attributes that make women feel confident with the system by including them into the planning process.

Table 7. Mean Score for level of fear indication travelling at different time of the day accordingly to age of respondent. *0-Not fear10-Very fear

Age group	In the 20's	In the 30's	In the 40's	In the 50's
Day time	2.3	3.3	4.2	3.1
After dark (At night)	7.6	8.8	9.8	9.9

4. Conclusion

Many studies have focused on the relationship between transport service characteristics towards women travel safety from accident point of view. However, less research has been devoted to the effect of poor public transport supply and its infrastructure and even fewer have linked women personal travel pattern towards crime exposure. The main contribution of this research is the analysis of the relationship of women personal travel pattern towards the travelling safety issues in an urban area. The result shows that most women who live in urban area who have no choice but to travel using public transport rate a higher feeling of unsafe when travelling not only during the night time but also during the day time. This research also found that age of women traveller also affect the level of safety indication where older women tend to rate a higher level of unsafe while travelling using public transport. Even though the number of crime occurrence in Malaysia has shown a declining trend, the feeling of unsafe among women traveller is still very high. Hence, all future transport planning should consider the feeling of safe and the factor affecting the feeling of safe while travelling among this vulnerable group to reduce the feeling of fear towards crime. Future research should consider the movement of rural women commuters on the same issues.

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References

- Amar, S.S. (2006), Crime Levels And Trends In The Next Decade, *Journal of Kuala Lumpur Police College*.
- Anderson, J., & Panzio, N. (1986). *Transportation and Public Safety: Services that Make Service Use Possible*. In J. Bruce & M. Kohn (Eds.), *Learning about Women and Urban Services*. Latin America and the Caribbean: Sage Publication.
- Astrop, A. (1996). Urban Travel Behavior and Constraints of Low-Income Households and Females in Pune, India. Paper presented at the Second National Conference on Women's Travel Issues, Baltimore.
- Atkins, S. (1989). Women travel and personal. *Transportation Journal*, 12(2), 17-45.
- Brighton & Hove (2004). Retrieved from *Safe in The City*. <http://www.safeinthecity.net/index.html>. June 2006.
- British Crime Survey. (1994). Retrieved from *Anxiety about crime*. <http://www.crimeconcern.com>. July 2002.
- Crime concern. (2002). *People perception of personal security and their concern about crime on public transport*. Department of Transport.
- Criminal Department Unit (2005). *Crime in Malaysia* (Report): Royal Malaysia Police Department.
- Davidson, R. N. (1981). *Crime and the environment*. London: Croom Helm.
- Evans, D. J. (1995). *Crime and policing: Spatial approach*. England: Avebury.
- Ferraro, K. F., & LaGrange, R. (1987). The measurement of fear of crime. *Journal of Criminal Justice*, 57, 70-101.
- Focas, C. (1989). A survey of women's travel needs in London. *Journal of Transportation*, 12(2), 17-45.
- Gordon, P., Kumar, A., & Richardson, S. (1989). Gender differences in metropolitan travel behavior. *Transportation Journal*, 23(6), 449-510.
- Grieco, M., Pickup, L., & Whipp, R. (1989). *Gender, transport and employment*. Newcastle Upon Tyne: Athenaeum Press Ltd.
- Hafazah, A.K., Siti Mareenah, A.R., (2010). Community Participation: Towards A Safer Housing Environment, *ajE-Bs, Asian Journal of Environment –Behaviour Studies*.
- Hanlon, S. (1995). *Where do women feature in public transport?* Australia: Trans Adelaide.
- Hanson, S., & Hanson, P. (1981). *The impact of married women's employment of household travel pattern*: Wall Press.
- Hough, M., & Mayhew, P. (1985). *Taking account of crime: Key finding* (2nd Edition ed.): HMSO, London.

- Joanne, B. (2001). *The invisible woman: Gender, crime and justice* (Report). Toronto: Wadsworth Thomson Learning.
- Lynch, G., & Atkins, S. (1988). The influence of personal security fears on women's travel pattern. *Transportation Research Journal*, 15, 257-277.
- Seiji. S., Kazunori .H., Tatsuto.A., Takahito. S., & Kenji .O. (2011) People Crime Perception, and Attitude toward Community Crime Prevention Activities in Japan, *Journal Of ASIAN Behavioral Studies*.
- Sinha, B., Benjamin, J. M., & Koppelman, F. S. (1990). Personal security in busses and its effects on the ridership in Milwaukee. *Transport Engineering Journal*, 487, 13-25.
- Smith, W. R., & Torstensson, M. (1997). Gender differences in risk perception and neutralizing fear of crime: Towards resolving paradoxes. *British journal of criminology*, 37(4), 608-634.
- Taylor, R.B. 1995. *The Impact of Crime on Communities*, Annals of the American of Political and Social Science. 539. 28-45.
- Thygeson, G. (1990). *Handbook of road safety technology*: Traffic and transport (2nd Edition ed.): Gordon and Breach Science Publication.
- Watkins, A., Sorenson, B., & Garrick, C. (2002). *Accompaniment of road traffic signal controller using simulation techniques*. Australia: Australia Road Research Board Press.
- White, J. (1986). *Sex differences in urban commuting pattern*. The American economic review, 76(2), 368-332.